

REMARKS

Claims 1, 3-8, 10-14 and 16-25 are in this application and are presented for consideration. By this amendment, Applicant has amended claims 1, 4-7, 13, 14 and 16-20. Claims 2, 9 and 15 have been canceled and new claims 21-25 have been added.

The drawings have been objected to because of minor informalities.

Applicant has attached replacement sheets of drawings of Figures 1-9. Figures 1-9 have been amended such that elements 1, 2, 10 and 11 have proper cross-hatching. Applicant respectfully requests that the Examiner remove the objection to the drawings based on revised Figures 1-9.

Claims 1, 4-7, 9, 13 and 16-20 have been objected to because of minor informalities.

Applicant has amended the claims paying close attention to the Examiner's remarks. Applicant wishes to thank the Examiner for the careful review of the claims.

Claim 16 has been rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements.

Applicant has amended claim 16 to clarify that the another sealing area refers to the housing-side sealing area. It is Applicant's position that claim 16 as now presented does not omit essential structural features. Accordingly, Applicant respectfully requests that the rejection be removed in light of the changes made to claim 16.

Claims 1, 2, 5-11 and 14-20 have been rejected under 35 U.S.C. 102(b) as being anticipated by ZF Lemförder Metallwaren₁ (WO 02/077470).

The present invention relates to a sealing bellows of a ball-and-socket joint. The ball-

and-socket joint includes a ball, a pivot that originates from the ball and a housing that accommodates the ball. The sealing bellows extends between the pivot and the housing. The sealing bellows comprises a pivot-side sealing area, a jacket area and a housing-side sealing area. The jacket area consists of an elastomeric material. The pivot-side area of the sealing bellows is formed of a material that is different than the elastomeric material that forms the jacket area of the sealing bellows. The material that is used for the pivot-side sealing area is a slidable elastomer that has a coefficient of friction that is lower than the material of the pivot. The pivot-side sealing area comprises radial sealing lips that extend in the radial direction of the pivot and axial sealing lips that extend in the axial direction of the pivot. The axial sealing lips engage a lug that is located opposite the jacket area. The radial sealing lips engage the pivot. This advantageously provides excellent sealing characteristics so that contaminants are prevented from entering the joint. The fact that the sealing bellows has a jacket area and at least one sealing area that are composed of different materials is significant in the present invention because the elastomer material allows the pivot-side area to slide along the pivot to provide a tight seal while the elastomeric material of the jacket area has excellent elasticity to allow the jacket area to follow the motions of the pivot. The prior art as a whole fails to disclose such features and such excellent sealing advantages.

ZF Lemförder Metallwaren₁ discloses a ball-and-socket joint. The joint comprises a housing and a ball pivot 3 that is pivotably positioned in the housing. A sealing bellows 1 is fixed to the housing and positioned on the ball pivot 3 in a sliding manner, via a sealing ring 4 provided with two limbs 5, 6. A first limb 5 of the two limbs 5, 6 is arranged on the ball pivot

3 under tension and the second limb 6 engages in the wall of the sealing bellows 1. The second limb 6 is fixed in an anchoring ring 7 that is at least partially arranged in the wall of the sealing bellows 1.

ZF Lemförder Metallwaren₁ fails to teach and fails to suggest the combination of a pivot-side sealing area that has a plurality of axially extending sealing lips that engage a lug that is located opposite a jacket area. At most, ZF Lemförder Metallwaren₁ discloses a sealing ring 1. However, the sealing ring 1 of ZF Lemförder Metallwaren₁ does not have sealing lip portions as claimed. In fact, the sealing ring of ZF Lemförder Metallwaren₁ does not engage a lug as featured in the present invention. ZF Lemförder Metallwaren₁ takes a different approach by providing a sealing ring 4, which is a thin disc, that is in contact with the sealing bellows 1 such that the sealing bellows slides along the ball pivot 3 via the sealing ring 4. This disadvantageously does not provide for good sealing characteristics since the sealing bellows 1 of ZF Lemförder Metallwaren₁ does not have any sealing lips that are in contact with the ball pivot 3 as claimed. In contrast to the present invention, ZF Lemförder Metallwaren₁ only discloses that the sealing bellows is in contact with a sealing ring 4, but the sealing bellows does not contact the ball pivot 3 or a lug as claimed. Further, Figure 1 of ZF Lemförder Metallwaren₁ clearly shows a sealing bellows that is composed of a single material. Figure 1 of ZF Lemförder Metallwaren₁ fails to show that the sealing bellows 1 composes different materials as claimed. As such, the prior art as a whole takes a different approach and fails to disclose each and every feature of the claimed combination. Accordingly, Applicant respectfully requests that the Examiner favorably consider claims 1 and 14 as now presented and all claims

that respectively depend thereon.

Claims 3 and 4 have been rejected under 35 U.S.C. 103(a) as being unpatentable over ZF Lemförder Metallwaren₁ in view of Turner (U.S. 2,388,097).

As previously discussed above, ZF Lemförder Metallwaren₁ fails to provide any teaching or suggestion for a pivot-side sealing area that engages a pivot and a lug as claimed. Turner also fails to teach or suggest the combination of a pivot-side sealing area that engages a lug as claimed. As such, all claims define over the prior art as a whole.

Claim 12 has been rejected under 35 U.S.C. 103(a) as being unpatentable over ZF Lemförder Metallwaren₁ in view of Nakamura (U.S. 5,431,601).

As already discussed above, ZF Lemförder Metallwaren₁ provides neither a teaching nor a suggestion for the combination of a pivot-side area of a sealing bellows that is composed of a material that is different from a jacket area of the sealing bellows. Nakamura also fails to provide any teaching or suggestion for the combination of two different areas of a sealing bellows that is composed of different materials. Nakamura merely discloses a small-diameter ring portion 31 and a bellows portion 35. However, Nakamura is void of any mention that the small-diameter ring portion 31 is made of a different elastomer than the sealing bellows portion 35. In fact, Nakamura does not provide any teaching for the specific hardness of the jacket area as claimed. The hardness of the jacket area is significant in the present invention because it advantageously provides the sealing bellows with sufficient elasticity to follow the motions of the pivot. This advantageously provides for an extremely tight seal so that contaminants are prevented from entering the joint. Nakamura fails to disclose such excellent sealing advantages

since Nakamura does not disclose that the sealing bellows portion 35 has a material hardness as claimed. As such, all claims define over the prior art as a whole.

Claim 13 has been rejected under 35 U.S.C. 103(a) as being unpatentable over ZF Lemförder Metallwaren₁ in view of ZF Lemförder Metallwaren₂ (WO 02/093028).

ZF Lemförder Metallwaren₂ discloses a ball-and-socket joint for chassis suspensions or steering systems of motor vehicles. The joint comprises a housing, a joint pin 1 consisting of a spherical surface 3 and a pin part 2. The joint pin is positioned by means of its spherical surface in the housing 5 in a rotational and pivotable manner. The joint pin is fixed by pin part 2 in a receiver 7 on a chassis side. An elastic sealing bellows 8 is statically fixed to the housing 5 and is fixed to the pin part 2 by at least one sealing seat. The sealing seat comprises an elastic sealing ring 11 that lies directly on the joint pin 2 under pre-stress or is connected in a material fit with the same between the sealing bellows 8 and the joint pin 2, and an annular sleeve 13 which is arranged between the sealing bellows 8 and the sealing ring 11.

As previously discussed in length above, ZF Lemförder Metallwaren₁ does not disclose a pivot-side area of a sealing bellows having a plurality of sealing lips as claimed. ZF Lemförder Metallwaren₂ fails to teach or suggest important features of the claimed combination. ZF Lemförder Metallwaren₂ does not teach and does not suggest the combination of a sealing bellows that has a jacket area and a pivot-side area wherein the pivot-side area is composed of a slidable elastomer. In fact, ZF Lemförder Metallwaren₂ does not disclose that the sealing ring 11 has sealing lips that extend in the axial and radial directions. ZF Lemförder Metallwaren₂ is completely void of a sealing bellows that has a pivot-side area that is in contact with a pivot as

claimed. Compared with the present invention, ZF Lemförder Metallwaren₂ merely discloses a sealing ring 11 that is not a part of a sealing bellows 8 since the sealing bellows 8 slides relative to the sealing ring 11 attached to the pin part 2. Further, the person of ordinary skill in the art would not combine the teachings of ZF Lemförder Metallwaren₁ with the teachings of ZF Lemförder Metallwaren₂ since the sealing ring 4 of ZF Lemförder Metallwaren₁ is sliding on the ball pivot 3 whereas the sealing ring 11 of ZF Lemförder Metallwaren₂ is statically fixed on the joint pin 2. The sealing ring 4 of ZF Lemförder Metallwaren₁ is a thin flexible disc whereas the sealing ring 11 is compact and provides for a greater distance between the sealing bellows and the joint pin 2. It would not be possible to arrange reinforcing elements according to ZF Lemförder Metallwaren₂ within the sealing ring 4 because the disc-shaped sealing ring 4 has to flex so as to seal against the ball pivot 3. As such, the prior art as a whole fails to disclose a prima facie case of obviousness since the person of ordinary skill in the art would not look to the teachings of ZF Lemförder Metallwaren₂ to modify the arrangement of ZF Lemförder Metallwaren₁. Accordingly, all claims define over the prior art as a whole.

Applicant has added new claims 21-25. New independent claim 24 highlights that the reinforcing element 5 is surrounded in partial areas by the jacket area 2 and that other areas of the reinforcing element 5 extend toward the pivot 6 such that another portion of the reinforcing element 5 engages the pivot 6. New dependent claims 21-23 and 25 have been added to clarify the features of the invention. Applicant respectfully requests that the Examiner favorably consider new claims 21-25.

Favorable consideration on the merits is requested.

Respectfully submitted
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Attached: (3) Sheets of Replacement Drawings

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